

# Prime and Composite Numbers

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# CONCEPT 1

## Prime and Composite Numbers

Here you'll learn how to classify given numbers as prime or composite.

Have you ever had to organize something?

Before the sixth grade social, Cameron and Lilly have been assigned the task of organizing the paper products. They have collected 15 spoons and 31 forks.

"We have double forks to spoons," Cameron says to Lilly.

"Yes, but even if we double the spoons, we will have one fork left over," Lilly comments.

In thinking about the number of forks and spoons, you can also think about prime and composite numbers. One of these numbers is prime and one is composite.

Do you know which is which? Can you explain why?

**This Concept defines and explains prime and composite numbers. By the end of it, you will also understand prime and composite numbers better.**

### Guidance

Now that you have learned all about identifying and finding factors, we can move on to organizing numbers. We can put numbers into two different categories.

These categories are *prime* and *composite*. The number of factors that a number has directly determines whether the number is considered a *prime number* or a *composite number*.

**What is a prime number?**

A Prime Number is a number with only two factors, 1 and itself.

7 is an example of a prime number.

Its factors are  $1 \times 7$ .

Prime numbers are special numbers. As you can see in the text box, a prime number has only two factors. You can only multiply one and the number itself to get a prime number.

Think about 13. Is it a prime number? Yes. You can only get thirteen if you multiply 1 and 13. Therefore it is prime. Here is a chart of prime numbers.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Be particularly careful when considering the number "1". One is neither prime nor composite.

### What is a composite number?

A composite number is a number that has more than two factors. Most numbers are composite numbers. We can see from the chart that there are 25 prime numbers between 1 and 100. The rest are composite because they have more than two factors.



*Take a few minutes to take some notes on prime and composite numbers.*

Now it's time for you to try a few on your own.

### Example A

True or false. If a number has more than two factors, the number is prime.

**Solution: False. Numbers with more than two factors are composite numbers.**

### Example B

True or false. The operation associated with factors is addition.

**Solution: False. The operation associated with factors is multiplication.**

### Example C

Explain why 29 is a prime number.

**Solution: 29 is a prime number because the only two factors for 29 are 29 and 1.**

Now back to the forks and spoons. Here is the original problem once again.

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"We have double forks to spoons," Cameron says to Lilly.

"Yes, but even if we double the spoons, we will have one fork left over," Lilly comments.

In thinking about the number of forks and spoons, you can also think about prime and composite numbers. One of these numbers is prime and one is composite.

Do you know which is which? Can you explain why?

To identify a prime or composite number, we have to think about factors. If a number has more than two factors, itself and 1, then the number is composite. Let's look at these two values.

15 has the factors:  $1 \times 15$   $3 \times 5$

**Therefore, 15 is a composite number.**

31 has the factors:  $1 \times 31$

**Therefore, 31 is a prime number.**

## Vocabulary

Here are the vocabulary words in this Concept.

**Factors** numbers multiplied together to equal a product.

**Divisibility Rules** a list of rules which help you to determine if a number is evenly divisible by another number.

**Prime** a number that has two factors, one and itself.

**Composite** a number that has more than two factors.

## Guided Practice

Here is one for you to try on your own.

Prove that 91 is a prime number.

**Answer**

To start, we have to list out all the factors of 91.

91 has the factors:

$1 \times 91$

Not 2, 3, 4, 5, 6

How about 7?

Let's divide 91 by 7.

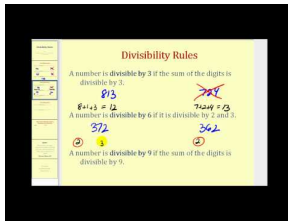
$91 \div 7 = 13$

91 also has the factors 13 and 7.

**91 is not a prime number. It is a composite number.**

## Video Review

Here are videos for review.



## MEDIA

Click image to the left for more content.

### James Sousa Divisibility Rules

1. [http://www.mathplayground.com/howto\\_primenumbers.html](http://www.mathplayground.com/howto_primenumbers.html) – This is a good basic video that reviews prime numbers.

### Practice

Directions: Identify the following values as prime or composite?

1. 12
2. 10
3. 15
4. 16
5. 56
6. 18
7. 20
8. 22
9. 23
10. 25
11. 27
12. 31
13. 81
14. 48
15. 24
16. 30